

State of Hawaii
DEPARTMENT OF LAND AND NATURAL RESOURCES
Engineering Division
Honolulu, Hawaii 96813

July 28, 2006

Board of Land and Natural Resources
State of Hawaii
Honolulu, Hawaii

**Authorization to Execute Amendment No. 1 to the Agreement Between the Department of Army
And the Department of Land and Natural Resources For the Ala Wai Canal Project
(Watershed) Feasibility Study, Honolulu, Oahu, Hawaii**

Background

On September 8, 2000, the Board of Land and Natural Resources authorized the Chairperson to sign the Feasibility Cost Sharing Agreement for the Ala Wai Watershed Feasibility Study and on April 11, 2001, the Agreement between the Department of Army and the State of Hawaii-Department of Land and Natural Resources was executed. The Agreement designated the Department of Army to conduct a feasibility study to formulate potential alternatives that address ecosystem restoration as well as flood mitigation in and adjacent to the Ala Wai Canal. In addition to the feasibility study, the Department of Army will prepare an Environmental Impact Statement in accordance with NEPA 42 USC 4321 and Hawaii Revised Statutes, Chapter 343; water quality permits; cultural studies; and other studies/permits needed to implement the project.

In January 2003, the Executive Committee made up of representatives from the Department of Army and Department of Land and Natural Resources agreed that there would be substantial benefits to expanding the project area from the Ala Wai Canal to the entire Ala Wai Watershed, which includes three (3) major drainage basins that feed into the Ala Wai Canal. The drainage basins include, the Manoa, Palolo and Makiki Streams. It is important to note that the October 30, 2004 flooding in Manoa Valley substantiated the need to expand the project area and public's desire to investigate flood control measures throughout the watershed.

Due to the expansion of the project area, the study cost has increased from \$1,520,000 to \$5,100,000. This cost will continue to be split evenly between the Department of Army and the Department of Land and Natural Resources. The Department of Land and Natural Resources will need to contribute \$2,050,000 in cash and \$500,000 in in-kind services, as its share of the study cost. Approximately \$200,000 has been received from the City and County of Honolulu for their contribution to the study cost.

Amendment to the Existing Agreement

Amendment No. 1 to the Agreement Between the Department of Army and the Department of Land and Natural Resources For the Ala Wai (Watershed) Feasibility Study is a standard document used by the Department of Army. This Amendment and original Agreement stipulates the obligations of both parties, method of payment, project coordination, standard terms and conditions.

The Project Management Plan provides a plan for management and execution of the subject project through the feasibility phase. Specifically, it documents the assumptions, work tasks, products and level of detail that will be necessary to complete the feasibility phase.

Project Schedule

MAJOR PROJECT MILESTONES	ESTIMATED COMPLETION DATE
Preliminary Draft Feasibility Report/EIS	November 2008
Draft Feasibility Report/EIS	April 2009
Final Feasibility Report/EIS	January 2010

Funds for this project are available from and as authorized from Act 281, SLH 2000, Item A-16C and Act 178, SLH 2005, Item A-7, as amended by Act 160, SLH 2006, Item A-7.

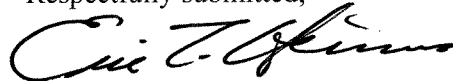
For your information and review, the following documents are attached:

1. Draft Amendment No. 1 to the Agreement between the Department of the Army and the Department of Land and Natural Resources for the Ala Wai Canal Project Feasibility Study;
2. Project Management Plan for the Ala Wai Canal Project; and
3. Land Board Submittal Item D-13, dated September 8, 2000.

RECOMMENDATION:

Recommend that the Board authorize the Chairperson to sign Amendment No. 1 to the Agreement Between the Department of Army and the State of Hawaii-Department of Land and Natural Resources For the Ala Wai Canal Project (Watershed) Feasibility Study and other necessary documents pertaining to the study, subject to Deputy Attorney General's approval as to form and release of funding by the Governor.

Respectfully submitted,



ERIC T. HIRANO
Chief Engineer

Approved For Submittal:


PETER T. YOUNG, Chairperson

AMENDMENT NO. 1
TO THE AGREEMENT
BETWEEN THE DEPARTMENT OF THE ARMY
AND
THE STATE OF HAWAII - DEPARTMENT OF LAND AND NATURAL RESOURCES
FOR THE ALA WAI CANAL PROJECT FEASIBILITY STUDY

THIS AMENDMENT NO. 1 is entered into this _____ day, of _____, 20_____, by and between the Department of the Army (hereinafter the "Government"), represented by the District Engineer executing this Amendment, and the State of Hawaii - Department of Land and Natural Resources (hereinafter the "Sponsor").

WITNESSETH, THAT:

WHEREAS, the Government and the Non-Federal Sponsor entered into a Feasibility Cost Share Agreement on April 11, 2001 (hereinafter the "Agreement") for a feasibility study of the Ala Wai Canal Project (hereinafter the "Project");

NOW, THEREFORE, the Government and the Sponsor agree to amend the Agreement as follows:

1. Delete the text of Article III.A. and replace with the following:

The Government shall maintain current records of contributions provided by the parties, current projections of Study Costs, current projections of each party's share of Study Costs, and current projections of the amount of Study Costs that will result in excess Study Costs. At least quarterly, the Government shall provide the Sponsor a report setting forth this information. As of the effective date of this Agreement, estimated Study Costs are \$5,100,000 and the Sponsor's share of estimated Study Costs is \$2,550,000. In order to meet the Sponsor's cash payment requirements for its share of estimated Study Costs, the Sponsor must provide a cash contribution currently estimated to be \$2,050,000. The dollar amounts set forth in this Article are based upon the Government's best estimates, which reflect the scope of the study described in the PSP, projected costs, price-level changes, and anticipated inflation. Such cost estimates are subject to adjustment by the Government and are not to be construed as the total financial responsibilities of the Government and the Sponsor.

2. All other terms and conditions of the Agreement remain unchanged.

IN WITNESS WHEREOF, the parties hereto have executed this Amendment No. 1 which shall become effective upon the date it is signed by the District Engineer for the U.S. Army Corps of Engineers, Honolulu District.

DEPARTMENT OF THE ARMY

THE STATE OF HAWAII -
DEPARTMENT OF LAND AND
NATURAL RESOURCES

BY _____
David E. Anderson
Lieutenant Colonel, U.S. Army
District Engineer
Honolulu District

BY _____
Peter Young
Chairperson
State of Hawaii
Board of Land and Natural Resources

APPROVED AS TO FORM

BY _____
Deputy Attorney General
State of Hawaii
Department of the Attorney General

PROJECT MANAGEMENT PLAN

ALA WAI CANAL PROJECT ISLAND OF O‘AHU, HAWAI‘I

Feasibility Phase Specifically Authorized (General Investigation)

July 2006 version (DRAFT)

1.0 PURPOSE

This Project Management Plan (PMP) provides a plan for management and execution of the subject project through completion of the feasibility phase. The PMP has been prepared in accordance with Engineering Regulation (ER) 5-1-11, 17 August 2001, USACE Business Process and is an internal document used to coordinate project schedules, budgets and cost estimates, and a resource allocation plan as appropriate for the feasibility phase. This PMP content is based on the 2001 Project Study Plan included in the Feasibility Cost Sharing Agreement (FCSA), and will be used as an inclusion to the FCSA for the expansion of the project area to the entire Ala Wai watershed, increase in hydraulic studies, and inclusion of Sponsor in-kind services that were omitted from the original study plan.

The project sponsor is the State of Hawai‘i, Department of Land and Natural Resources, Engineering Division.

This PMP documents the assumptions, work tasks, products and the level of detail that will be necessary during the feasibility phase to determine the existing and the future without project conditions; formulates a range of potential viable alternatives; assesses their environmental, social and cultural effects; and presents a clear rationale for the selection of the recommended alternative(s). The PMP includes a baseline estimate of the total study cost, schedule and assignment of responsibilities of all parties participating in the project study. The PMP, with its clearly defined work tasks and products, serves as a project management tool for cost and schedule control, establishing a basis for time and cost changes, and measuring progress and performance of all the study efforts.

The major focus of this PMP revision is to display the increase cost and time extension associated with an expanded project area and to characterize how the additional cost could be funded by other non-Federal parties. Specifically, this study investigates flood control measures and ecosystem restoration measures throughout the watershed including the Ala Wai Canal. It is important to note that this expansion is being sought as a result of the 30 Oct 04 flooding in the Mānoa Stream, and community desire to improve ecosystem health throughout the watershed.

This PMP reflects additional planning formulation, economic, engineering, and environmental investigations to be conducted for the expanded project. This PMP focuses on establishing a detailed scope of work, the schedule, and anticipated study costs associated.

The work shall generally follow the guidelines set forth by:

- “Planning Guidance Notebook,” ER 1105-2-100, dated 22 April 2000.
- “Engineering and Design for Civil Works Projects”, ER 1110-2-1150, dated 31 August 1999.
- “Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies”, 10 March 1983.
- “Procedures for Implementing NEPA”, Engineer Regulation (ER) 200-2-2, Department of the Army, Office of the Chief of Engineers, Washington, D.C., 4 March 1988.

2.0 PROJECT OBJECTIVE

Restoration – Improve watershed health through restoring degraded stream structures and functions.

Flood Control – Protect development throughout the watershed, including Waikīkī and surrounding areas from the 100-year flood.

3.0 AUTHORITY

The Ala Wai Canal Project is a multiple purpose project being investigated under the authority of Section 209 of the Flood Control Act of 1962 (Public Law 87-874). Section 209 is a general authority that authorizes surveys in harbors and rivers in Hawai‘i, “with a view to determining the advisability of improvements in the interest of navigation, flood control, hydroelectric power development, water supply, and other beneficial water uses, and related land resources.” The proposed plan of improvement consists of ecosystem restoration and flood control for the Ala Wai Canal and watershed area. The project features include, but are not limited to, improving water conveyance in upstream areas and through the canal, attenuating peak discharges, improving water circulation in the Canal, providing for sediment detention basins, stream bank stabilization, aquatic habitat improvement, and restoration of migratory pathways for native aquatic species.

4.0 PROJECT LOCATION AND SCOPE

The Ala Wai Canal is a two-mile long man-made waterway constructed during the 1920's to create and protect the Waikīkī area on the Island of O‘ahu. Urban development followed and has caused the area to become the most densely populated area in the State. The Ala Wai watershed encompasses more than 16 square miles. The carrying capacity of the canal has been significantly reduced by accumulation of silt and debris from the Mānoa, Pālolo, and Makiki drainage areas in recent years, thereby increasing the potential flood risk to the Waikīkī area. During the November 1965 and December 1967 storms and passage of Hurricane ‘Iniki in 1992, the Ala Wai Canal was overtopped causing flooding in the Waikīkī district. As highlighted by the October 2004 flood on Mānoa Stream, that caused damages to homes and the University of Hawai‘i, urban areas in the upper watershed are also at risk to flooding.

The Ala Wai Canal also serves as the only link between the freshwater ecosystems of the upper drainage basins and the marine environment along the coast. Endemic amphidromous species such as native gobies and shrimp that had once utilized the Waikīkī estuary as a migratory pathway from the mountains to the sea are nearly non-existent. The manmade conversion of the system, particularly the channelization of the streams, has resulted in the degradation of ecosystem structure and change in function. Urban uses and activities exacerbate the degradation by continuing to load the system with sedimentation, pollutants, nutrients, and introduction of alien species.

The Ala Wai Canal Project adopts a watershed approach to problem identification and solution. The investigations and evaluations are intended to be holistic. The Ala Wai Watershed Analysis (completed in July 2003) identified the problems and opportunities throughout the watershed, inventoried data, identified data gaps, and recommended actions to improve the overall health of the watershed.

History of the project investigation. The reconnaissance phase of the Ala Wai Canal Ecosystem Restoration Study was initiated in April 1999 under Section 209 of the Flood Control Act of 1962 in response to the 14 August 1995 request from the State of Hawai‘i, Department of Land and Natural Resources. At that time Federal, State and local agencies sought a comprehensive management and restoration plan to restore aquatic habitat and biological diversity once present in the estuary and upstream tributaries that are now covered by urban development. The reconnaissance report recommended that the Corps of Engineers assist the State with restoration of the canal. The reconnaissance report was submitted to the Pacific Ocean Division on 18 August 1999 and approved by HQUSACE for continuation into the feasibility phase on 8 September 1999. During the preparation of the feasibility cost sharing agreement, the study title was revised to the “Ala Wai Watershed Study” though the focus remained on the canal area.

The potential flood risk to Waikīkī remains a major concern to the local sponsor. In response to State Senator Ihara’s initiative to determine the potential flood risk to the Waikiki area, the Ala Wai Flood Study was initiated in September 1998 under the Planning Assistance to States (PAS) Program and completed in October 2001. This study identified a few straightforward mitigative measures and conceptual alternatives that have the potential to minimize flood damages to the Waikīkī and surrounding area. Data from this technical study was used in establishing that the Corps could be involved in the investigation of flood control in the canal. As a result, the flood control purpose was added to the “Ala Wai Watershed Study”. The project focus was expanded from restoration only to flood control and restoration in the canal area.

At the time the Corps and State entered into the feasibility cost sharing agreement, the Ala Wai Watershed Study focused on restoration and flood control in the canal area only. The project title in congressional documents remained the “Ala Wai Canal Project” and is maintained from this point forward for consistency purposes.

At the onset of the feasibility study, the current project manager approached State representatives about expanding the project area to take advantage of the broadness of the Section 209 study authority. In January 2003, the Executive Committee agreed that there would be substantial

benefits to expanding the project area from the canal to the entire watershed and to include additional financial sponsors. The Executive Committee instructed the PM to provide the Committee with details of the expanded study, including cost increases, time extension, advantages and disadvantages to the expanded study, and report on additional sponsorship.

The expanded Ala Wai Canal Project. The project area now includes not only the Ala Wai Canal but also the watershed. The Ala Wai watershed is comprised of three major drainage basins that feed into the Ala Wai Canal. The Mānoa and Pālolo Stream meet at a confluence and forms the Mānoa-Pālolo channel that eventually drains into the Ala Wai Canal. The Makiki Stream, draining the McCully basin, also feeds into the Ala Wai Canal approximately ½ mile downstream of the Mānoa-Pālolo outlet. The upper reaches of both basins are heavily forested with very sparse population. However, population and urbanization increases dramatically towards the lower reaches of the basins near its termination in the Waikiki area.

With the accumulation of sediments and pollutants over time, water quality in the canal has declined significantly resulting in warning signs being posted along the canal warning people about the potential health risks associated with the consumption of fish and crabs. The degradation of water quality has also limited aquatic fauna to alien species capable of surviving in low dissolved oxygen-high sediment aquatic environments. According to a 1989 Hawai'i Stream Assessment Survey, native species of gobies once present within the Ala Wai tributaries were no longer found in a recent Fish and Wildlife Survey of the upper Pālolo Watershed.

The purpose of the feasibility study is to identify and formulate potential alternatives that address ecosystem restoration and flood damage reduction and to obtain approval from Congress for project construction. These alternative plans will be evaluated for engineering adequacy, economic viability, environmental acceptability and project sponsor support. The feasibility study will develop, in detail, all needs to be addressed. Detailed analysis of the alternatives considered during the reconnaissance investigations, as well as additional alternatives that are appropriate, will be undertaken. The feasibility study will result in a recommendation for an implementable solution to the identified environmental and potential flooding problem. The feasibility report will be a complete decision document used by the non-federal sponsor and the Corps of Engineers to authorize construction of the recommended plan. The feasibility report will:

- Contain sufficient engineering and design to enable further refinement of project features, prepare the baseline cost estimate, and develop a design and construction schedule;
- Allow authorization of the report findings through the Division. Allow design on the selected plan to start immediately following receipt of design funds;
- Contain environmental documentation to satisfy all National Environmental Policy Act (NEPA), HRS Chapter 343, and other statutory environmental requirements;
- Indicate compliance with applicable statutes, executive orders and policies; and
- Provide a sound and documented basis for decision-makers at all levels to judge the recommended solution(s).

The feasibility phase is completed upon the feasibility report submittal to the Office of Management and Budget by the Assistant Secretary of the Army for Civil Works. Both the District Commander and the non-federal sponsor will be advised when the feasibility phase is completed to trigger the termination of the FCSA. The feasibility study will be cost shared equally between the Federal government and the non-federal sponsor.

5.0 REQUIREMENTS

The work to be performed shall consist of the development of alternative plans based on levels of protection from flooding and potential environmental outputs. As a minimum the following work tasks shall also be accomplished as part of this analysis:

5.1 Ecosystem Restoration

- Selection of a recommended plan will be based on current guidance for ecosystem restoration activities in the Civil Works Program. Adherence to Civil Works policy will ensure that investments in ecosystem restoration will have the intended beneficial effects, are consistent with Administration policy, and will be conducted in the most cost effective manner.
- A feasibility-level design of the recommended plan;
- Identifying and addressing the concerns and needs of various private and public entities;
- Identification of the potential needs and opportunities to reduce storm water pollution loading, and to protect / enhance natural resource areas that are or may be affected by storm water drainage;
- Determining the ecosystem restoration maintenance relationship for the with- and without-project conditions;
- Prepare construction and operation and maintenance cost estimates for the recommended plan;
- Compute potential environmental outputs and cost for the recommended plan that addresses ecosystem restoration;
- Evaluate ecosystem restoration alternatives based on cost effectiveness and incremental cost analysis;
- Based on biological and ecological resources, socioeconomic resources, cultural resources and recreation, an assessment will be conducted on the potential environmental outputs and social impacts for the various ecosystem restoration alternatives;
- Provide a real estate gross appraisal report;
- Perform geotechnical investigations and analyses where applicable;
- Prepare the required documentation to present the studies, findings, and recommendations;
- Document the public involvement program and secure interagency and project sponsor support.

5.2 Flood Mitigation

- Selection of a recommended plan based on the requirements of the National Economic Development criteria;
- A feasibility-level design of the recommended plan;

- Identifying and addressing the concerns and needs of various private and public entities;
- Delineation of the drainage basin boundaries and major drainage systems;
- Identification of the hydraulic capacities and level-of-protection afforded by the existing major drainage systems;
- Identification of alternatives that will improve existing drainage conditions and provide adequate flood protection for the study area under future development conditions;
- Determining the flood protection-maintenance relationship for the with- and without-project conditions;
- Prepare construction and operation and maintenance cost estimates for the recommended plan;
- Compute annual benefits and cost for the recommended plan;
- Evaluate the engineering and economic feasibility for the recommended plan;
- Assess the environmental and social impacts for the various alternatives including impacts on biological resources, socioeconomic resources, cultural resources, and recreation;
- Provide a real estate gross appraisal report;
- Perform geotechnical investigations and analyses;
- Prepare the required documentation to present the studies, findings, and recommendations.
- Document the public involvement program and secure interagency and project sponsor support.

The feasibility report begins the process leading to approval by the Division Commander. This process consists of feasibility study scoping meeting, conducting the feasibility study, conducting an Alternative Formulation Briefing, completion of the draft feasibility report, concurrent HQ/POD and public review of the draft feasibility report, preparation of the final feasibility report, District Engineer's recommendation for project implementation, Division Engineer's endorsement, signed Chief of Engineer's report to the Assistant Secretary of the Army for Civil Works, and submission of the feasibility report to the Office of Management and Budget.

The planning investigation may be terminated if there is no clear Federal interest in a solution or if the proposed solution does not meet the current policies or budget priorities. The feasibility study may be terminated by either party under the provisions stated in the FCSA. When no recommendation for Federal action is to be made, the goal will be to conclude the study in such a way that a useful product can be provided to local interests. The level of detail documented shall be commensurate with General Investigation policy and guidelines. All technical reviews shall be conducted on a value-added basis. Of course, the extent of documentation must minimally satisfy sound technical, regulatory, and statutory requirements.

5.3 Alternative Plans

During the reconnaissance phase, alternatives were identified in an attempt to determine if a Federal interest exists. In the feasibility phase, an evaluation of the level of protection provided by the project will be optimized according to an economic analysis of the costs and benefits. Soil borings will be taken to better define the existing soil conditions and to prepare detailed designs

of the recommended plan. A hydraulic analysis of the drainage conditions in the watershed will also be performed. Design features will be fully evaluated with respect to the latest engineering, economic, and environmental regulations for acceptability under current Federal laws and regulations. Any adverse effects of the plan that require modifications to the project will be identified and appropriate mitigation measures will be included. The flood control alternatives and ecosystem restoration alternatives that will be developed during the feasibility phase include, but are not limited to, the following:

5.3.1 Alternative 1 - No Action. The Ala Wai Canal and its tributaries are inadequate to contain the flows resulting from heavy rains and storm runoff in the Ala Wai Watershed. Additionally, the water quality of the Ala Wai Canal and its tributaries is poor. With the existing density of commercial and residential development and additional development proposed for the region, the No Action alternative was considered to be non-responsive to the problems and needs of the people and County requiring flood protection and environmental restoration.

5.3.2 Alternative 2 - Canal Dredging. Dredging will increase the conveyance of the Canal. The Ala Wai Flood Study analysis showed that there would be measurable improvements in conveyance by dredging the Canal bottom beyond the elevation maintained by the State. The dredging of the Canal will restore the ecosystem to a state similar to that which existed in the Canal's earlier years. The estimated average annual cost of dredging and disposal of material exceeds \$1.5 million. Based on recently identified contaminants in the dredged material, the overall cost may be considerably higher due to ocean disposal. Dredging the Ala Wai Canal would increase the flood capacity of the channel. According to a report prepared for the State of Hawaii by Ed Noda & Associates, Inc., "Ala Wai Canal Improvement Project Storm Water Capacity Study", January 1994, the most cost effective channel deepening option would be to dredge the channel at two depths. The 1994 study used a one-dimensional hydrodynamic computer model to simulate flood water levels with existing conditions of the Ala Wai Canal. Results found that dredging the Canal 3000 linear feet downstream and 4000 linear feet upstream McCully Street Bridge to 13 and 11 feet below the mean sea level (MSL), respectively, would significantly reduce the water level for the 100-year event flood. The assumption was made in this analysis that the entire width of the Canal would be dredged. Inputting this data into the HEC-RAS model, the water surface elevation for a 100-year event flood would range from 6.5 to 8.5 feet MSL along the Canal (Sta.35+07 to 106+25), overtopping the banks. Flooding would still occur as this measure does not fully mitigate flooding for the 100-year event. Results from the 1994 study found that drastically larger quantities of material would need to be dredged to lower the water surface below the side banks and contain the 100-year event. Dredging to -17 feet MSL, instead of -12 feet MSL would only drop the overall water surface elevation less than a foot.

5.3.3 Alternative 3 – Construct Walls/Levees Along the Canal and Streams. The 100-year flood event would be contained within the channels by adding floodwalls and raising existing ones along the banks of the Ala Wai Canal and Makiki and Manoa-Palolo Streams.

Floodwalls on Ala Wai Canal would extend along the left-bank on Ala Wai Boulevard, from the top of the channel (Sta.106+25, adjacent the Waikiki-Kapahulu Public Library) and on the right-

bank from Manoa-Palolo Stream mouth, both continuing down to Ala Moana Boulevard Bridge (Sta.8+38). Length of floodwalls would be 10,000 feet left-bank and 6,000 feet right-bank. The floodwalls upstream McCully Street Bridge would be 17.4 feet MSL (11 to 14 feet high) in order to contain a 100-year flood event with a water surface elevation of 14 to 15.4 feet MSL. Wall elevations between Kalakaua and McCully Bridges (Sta.27+37 to 34+78) would be 15 feet MSL (approximately 10 feet high). And wall elevations between Kalakaua Avenue and Ala Moana Boulevard (Sta.8+38 to 27+37) would be 8.5 to 10 feet MSL (4.5 to 6 feet high).

Floodwalls on Manoa-Palolo Stream would be installed and raised on the left and right-banks from Kapiolani Boulevard to Date Street Bridges and would be 17.4 to 22.5 feet MSL (5 to 9 feet high) and 1,700 and 1,500 feet long, respectively. The floodwall downstream Date Street on the right-bank would be 17.4 feet MSL (6 to 15.5 feet high) and 2,200 feet long. The reaches adjacent to Ala Wai Golf Course along Ala Wai Canal and Manoa-Palolo Stream would not have a floodwall. The golf course would be used as a flood and sediment basin. An earthen berm would be placed at the edges of the golf course along Date Street and Kapahulu Avenue (5200 linear feet).

On Makiki Stream, floodwalls would be raised on the left and right-banks from King Street (Sta.31+60) to the mouth of the stream. The reach upstream Sta.14+74 to King Street was not evaluated in HEC-RAS. The water surface elevation at Sta.14+74 was calculated at 17.82 feet MSL, with a floodwall elevation of 20 feet MSL. The assumption was made that these elevations would be the same and used for the reach upstream Sta.14+74. Therefore, floodwalls on both banks would be raised 2 to 18 feet for Makiki Stream, for a length of 3,000 linear feet.

McCully Street and Kalakaua Avenue Bridges (Ala Wai Canal), Date Street Bridge (Manoa-Palolo Stream) and Philip Street, Fern Street and Kapiolani Boulevard Bridges (Makiki Stream) may need to be raised.

In order to remove interior drainage flow from the Waikiki area, a 10x10 square-foot box culvert would need to be installed beneath Ala Wai Boulevard. During high water periods, blocked flows will empty out downstream Kalakaua Avenue into the Canal. A pump station and floodgate would be installed on the right-bank of Ala Wai Canal, Sta. 47+00, in order to pass water from Husten Ditch into the Canal, during high water periods. See the Hydrology Appendix for further discussion.

5.3.4 Alternative 4 – Modify McCully and Kalākaua Bridges. Three bridges cross the Ala Wai Canal. Ala Moana Boulevard Bridge is six lanes wide over two piers and three bays (center bay is approximately 70 feet wide and the two outside bays are approximately 50 feet wide). Kalakaua Avenue Bridge is four lanes wide over two piers and three bays (center bay is approximately 50 feet wide and the two outside bays are approximately 40 feet wide). McCully Street Bridge is four lanes wide over six piers and five bays (each bay is approximately 30 feet wide). Kalakaua and McCully Bridges are angled to incoming flow directions, with the piers perpendicular to the flow.

Date Street Bridge crosses the Manoa-Palolo Stream within the project limits. This bridge is four lanes wide over two piers and three bays (center bay is approximately 56 feet wide and the two outside bays are approximately 28 feet wide).

Three roadway bridges, five pedestrian/driveway bridges and two culvert closures cross the Makiki Stream within the project limits. Kapiolani Boulevard Bridge is six lanes wide with one bay approximately 30 feet wide. Fern and Philip Street Bridges are two lanes wide with one bay approximately 20 feet wide. One pedestrian bridge along the promenade of the Ala Wai Canal crosses at the mouth of Makiki Stream. Four other pedestrian bridges cross this stream between Philip and King Streets. A roadway 220 linear feet (begins Sta.11+60, 8" thick concrete slab) and a parking lot 145 linear feet (begins Sta.21+50), enclose a portion of Makiki Stream.

5.3.5 Alternative 5 – Storage in the Ala Wai Golf Course. The use of the Ala Wai golf course as flood storage was evaluated in the preliminary flood study. This feature should be evaluated further to refine the specific amount, timing of use, and hydraulic diversion structure design.

5.3.6 Alternative 6 – Extend Canal at Kapahulu end to Waikīkī Shoreline. The Territory of Hawaii original canal plans included extending the canal from the current Kapahulu end out to Waikiki beach through the area of Kapiolani Park. The construction of a channel should be further evaluated including use only during high flow periods. The real estate acquisition is expected to be costly and may be objectionable to some. Water quality effects on Waikiki beach needs to be thoroughly evaluated.

5.3.7 Alternative 8 – Restore stream habitat. Stream habitat, particularly in the lower and mid watershed areas has been severely altered by the effects of urbanization. The straightening of stream beds into trapezoidal channels and the lining of many channels in the lower watershed has caused a direct loss of stream bed habitat, adjacent flood plains, and riparian habitat. Where space is available adjacent to the stream, channelization structures should be removed and replaced with a more natural stream bed and adjacent flood plains and riparian ecosystems. Where space is not available, low flow channels with shade and limited habitat can at least provide a route for fish and invertebrates to traverse the stream in search of prime habitat farther up in the valley.

5.3.8 Alternative 8 – Stabilize stream bed and bank. In many areas flood control structures and road crossings are intermixed directly with more natural stream segments. Where this occurs, the energy transmitted down the stream is often not balanced causing excessive erosion or deposition within the more natural channel. By stabilizing the stream bed and bank in these areas we strive to hasten the return of the stream to a more natural and stable configuration.

5.3.9 Alternative 9 - Provide Sediment Detention Basins and Bank Stabilization. The two most promising measures that will reduce sediment discharge appear to be construction of sediment detention basins and stream bank stabilization. The main sediment basin will be constructed on the Mānoa-Pālolo Canal but additional sediment basins and flotsam catchments may be constructed in the midwatershed (Kanewai Field, Mānoa Park, and Paradise Park) and upper

watershed in association with trail crossings. Numerous areas along the stream are in need of bank stabilization which will also reduce sediment load to the stream.

5.3.10 Alternative 10 – Restore stream cover/shade. According to stream scientists, the most ecologically devastating problem associated with channelization is the increase in water temperature caused by the shallow flows and lack of shade. Higher water temperatures favor competition by alien aquatic species and during hot summer days can reach extremes that are lethal to almost all stream life. By providing shade to streams, water temperatures may be lowered making the stream corridors passable by native fauna striving to access prime habitat in the upper watershed.

5.3.11 Alternative 11 – Re-create wetlands. Wetlands are known to provide multiple benefits to the environment including flood storage, filtration, improved water quality, and as habitat for endangered Hawaiian water fowl. Although we can not recreate the hundreds of acres of wetlands that were once present in the lower watershed, this project does create about 4 acres of wetland adjacent to a public high school. The ecological and environmental educational benefits of the wetland created on the Manoa-Palolo channel should be significant.

5.3.12 Alternative 12 – Reduce trash & sediment loads. A major problem in any urban area is trash. The project features should consider some means of trapping or removing trash from the water way before it exits to the ocean. Additionally, it is an expensive venture to dredge contaminated sediments from the canal periodically. In 2003, the State dredged the canal back to near original depths. About 175,000 CY of dredged material was removed and because of the unsuitability for upland disposal, was disposed of in the ocean. The cost was approximately \$12M.

5.3.13 Alternative 13 – Construct check dams. Small check dams can perform multiple positive functions within the watershed including sediment catchments and stream flow moderation. Erosion problems are the most severe in the upper watershed where slopes are greatest. Given the extremely flashy nature of storm flows in Hawaii, any effort to hold back or detain these flows will have a positive impact on flood prevention. Check dams serve to moderate the flashy flow of water within ephemeral stream beds and thereby reduce the erosion potential of these flows. Small check dams both reduce direct erosion at trail crossings and capture erosive materials from up higher in the watershed. Larger check dams in the mid watershed area serve to distribute excess water to flood containment basins, and to capture flotsam preventing it from clogging the stream at roadway crossings.

5.3.14 Alternative 14 - Redirecting the Mānoa-Pālolo Canal. The study will evaluate the feasibility of realigning the Mānoa-Pālolo channel through the Ala Wai Golf Course to the Kapahulu end of the Ala Wai Canal. A flow control structure across the existing Manoa-Palolo canal would create a sedimentation basin and direct low to medium flow volumes through the golf course in the new stream bed. This would create about 4 acres of freshwater wetlands and a sediment basin above the control structure which would reduce the sediment loading in the Ala Wai Canal and create habitat for endangered Hawaiian waterfowl species. The stream through the golf course would create additional habitat for aquatic and wetland species while providing a

clear migration route for fish and other aquatic invertebrates. The control structure would divert normal storm flows through the existing lower portion of the Manoa-Palolo canal. A second control structure on the stream as it exits the golf course could be closed during extreme flood events using the golf course to contain approximately 400 acre-feet of water to prevent the over-topping of the Ala Wai Canal into Waikiki.

5.3.15 Alternative 15 - Install Flushing System. Based on a report completed by Noda and Associates, it was determined that the addition of 30 to 40 cfs of clean sea water at the Kapahulu end of the Ala Wai Canal would improve water quality in the Ala Wai Canal. The report indicated that the clean sea water could be obtained by developing a series of deep groundwater wells or laying a submerged pipeline in the Ala Wai Canal, with the intake located in the entrance channel to the Ala Wai Boat Harbor. The added seawater will reduce the murky green discoloration of the Ala Wai Canal waters, which is the result of excessive phytoplankton growth. Further studies will be performed by the Department of Land and Natural Resources to determine the feasibility of locating the deep groundwater wells at the Honolulu Zoo parking lot and/or at Jefferson Elementary School.

5.3.16 Alternative 16 – Non Structural Measures: Though not necessarily implemented by this project, effective non-structural measures will be evaluated and proposed that may compliment structural measures.

- Land Use Planning
- Floodplain Regulations
- Zoning
- Building Codes
- Subdivision Regulations
- Stormwater Management
- Relocation and Acquisition
- Elevation and Floodproofing

6.0 WORK TASKS AND RESPONSIBILITIES

The work tasks for the feasibility study are described below:

6.1 Baseline Information. Studies completed prior to the writing of this version of the PMP will be incorporated into the feasibility evaluations. The reconnaissance study was completed in 1999, the Ala Wai Flood Study was completed in 2001, and the Ala Wai Watershed Analysis was completed in July 2003. The information gathered during these previous efforts will be taken into consideration and used as a basis for the feasibility study. The collected data will address current conditions and problems, public desires and concerns, and contribute to the establishment of the final planning criteria and planning objectives. The planning criteria and objectives, in turn, will be used to formulate the alternative plans to be evaluated and to determine any additional measures required to meet the final planning objectives.

6.2 Plan Formulation. The feasibility study initially focused on the preliminary alternatives identified in the reconnaissance report and the Ala Wai Flood Study, however, other alternatives

shall be considered during the plan formulation process. Depending on an alternative contribution to ecosystem restoration or flood mitigation, alternative plans will be formulated accordingly to Civil Works prescribed policies and procedures. This study will formulate and optimize alternative plans for implementation based on costs, benefits, environmental outputs and other related assessments. A recommended plan will be developed which maximizes net national economic development benefits or maximizes cost effectiveness. This plan will be identified as the National Economic Development (NED) plan.

Alternative plans, including the NED plan, shall be formulated in consideration of the following major criteria: Completeness, Effectiveness, Efficiency, and Acceptability. Completeness is measured by the extent to which a given alternative plan provides and accounts for all the necessary investments or other actions to ensure realization of the planned effects. Effectiveness is the extent to which an alternative plan addresses the identified problem and achieves the specified goals and opportunities. Efficiency is the extent to which an alternative plan is the most cost-effective means of providing flood protection, maximizing national economic benefits, and realizing opportunities consistent with protecting the nation's environment. Acceptability is the workability of the alternative plan with respect to acceptance by state, county, private and public entities, and its compatibility with existing laws, regulations, and public policies. Each alternative plan shall address the effects on fish, wildlife, plant life and cultural resources and include justifiable mitigative measures for consideration.

Alternative restoration plans shall be formulated considering the plans performance and cost effectiveness. The Institute for Water Resources model IWR-PLAN shall be used to display the inputs and outputs of the alternative plans. IWR-PLAN (cost effectiveness/incremental cost analysis)

6.3 Surveys. Aerial topographic surveying and mapping and digital orthophotos of the Canal area were completed as a part of the Ala Wai PAS Flood Study. Additional topographic data, utilizing traditional and contemporary data acquisition methods, will be obtained.

6.4 Hydrologic Investigations. This portion of the study will utilize data gathered from existing publications and site visits, including the Ala Wai Flood Study. The drainage basin boundary will be defined. Stage-discharge relationships will be determined from stream flow data gathered from the existing stream gage at the Mānoa-Pālolo Stream and other related gages. A regional statistical analysis of stream flows will be conducted and the results compared to existing data. Discharge-frequency relationships will be developed. HEC-RAS and Flo2D programs will be used to determine the flood plains and flood profiles for the different frequency events under existing conditions and with the alternative plans in place. The location and capacity of the interior drainage system will be determined for the Ala Wai Canal and upper urban areas. The flood plains and flood profiles for the combined flooding caused by various frequency events under without- and with-project conditions will be the basis for the economic analysis. Additionally, hydrologic analyses will take into consideration the dredging of the Ala Wai Canal completed in 2003. Any information pertinent to hydrologic investigations generated as part of the State's effort will be utilized during this feasibility study. A risk and uncertainty analysis will be completed for the hydraulic & hydrologic analysis.

The results of the hydrologic analysis will be presented in an appendix to the feasibility report. The appendix will include detailed descriptions of the methodology, assumptions, and data sources used in the analysis. Plates showing the affected area will be included in the appendix as will tables showing the outcome of the computer analyses.

6.5 Hydraulic Analysis and Design. Flood control alternatives will focus on alleviating flooding in Waikiki, Kapahulu, McCully, Mo'ili'ili, Ka'imukī, Mānoa, and Pālolo. Ecosystem restoration alternatives will focus on the watershed. The Ala Wai Flood Study has already identified a few conceptual alternatives that address flood mitigation though the measures were found to be limited in protection and not fully addressing the sponsor's needs, social and political concerns. Preliminary design analysis may begin on those alternatives that have been identified as potential viable alternative plans. Identification of potential environmental restoration plans that may be considered for further study and analysis will start with site visits to gather necessary field information. This information will be used to formulate and evaluate alternatives for ecosystem restoration. The alignments, gradients, and water surface profiles for the environmental restoration alternative plans will be calculated. The localized water surface profile and other hydrologic data may be required when evaluating ecosystem restoration alternatives. Input on the alternative plans from hydrology, structural and civil design, economics, real estate, environmental, cost engineering and other disciplines as well as from the project sponsor will be coordinated. Any information pertinent to flood control/environmental design generated as part of the State's effort will be utilized during this feasibility study.

The Hydraulic Appendix for the feasibility report will include the design analysis, risk and uncertainty analysis, the preparation of design plates, and documentation of the project formulation process. Design plates will include a general plan and vicinity map, and typical plans and sections for the ecosystem restoration and flood control alternatives.

6.6 Geotechnical Studies. Feasibility level geotechnical investigations and analyses will be performed as part of this study. The information collected from these investigations will be used to determine and analyze the geological conditions in the project area and their impacts on project feasibility.

The geotechnical investigation will consist of a site visit, drilling program, laboratory testing program, soils report, and surveys. Data collected from the field investigations will be required to assess the feasibility of proposed project alternatives. The drilling will be done by contract with the Federal government in-house forces preparing the contract, inspecting the operation, and logging the borings. The laboratory work and soils report will also be done by contract with monitoring by the Federal government in-house forces. Geological features which affect the project design, construction, or operation will be evaluated and documented.

The investigations and analyses performed will be documented in the Geotechnical Appendix. The appendix will include but is not limited to the following items:

- A brief description of the project;

- References to applicable publications, site visits, and technical reports;
- A description of the geological conditions at the site and in the area;
- A description of the project site including relevant surface features and subsurface conditions;
- Geotechnical engineering recommendations will be provided for project alternatives and related work. Designs will be provided and all analyses performed and laboratory test results will be documented in the text;
- Plates will be provided as required to support the investigations, analyses, and recommendations included in the geotechnical study appendix.

6.7 Environmental Studies. A joint Environmental Impact Statement (EIS) as required under NEPA 42 USC 4321 et. seq., and, on behalf of the project sponsor, under Hawai'i law (Chapter 343, HRS) will be prepared to determine the impacts of the alternatives being considered. The EIS shall incorporate all documentation requirements of the HRS and State Office of Environmental Quality Control (OEQC) and meet appropriate State filing and notification requirements. In support of the EIS, the following activities will be completed as part of this feasibility study:

- Water Quality Monitoring Plan and Certification. In accordance with ER 1105-2-100 and the Clean Water Act, a water quality monitoring plan will be formulated and coordination with the State to obtain Water Quality Certification will be initiated;
- Section 404(b)(1) Coordination. In compliance with the Clean Water Act, a Section 404(b)(1) evaluation will be completed. The results will be included with the EIS as an appendix;
- Section 7 of the Endangered Species Act (ESA) Clearance. Section 7 Clearance from U.S. Fish and Wildlife Service and the National Marine Fisheries Service. The feasibility study must be coordinated with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) in compliance with Section 7 of the Endangered Species Act of 1973, as amended, and the Fish and Wildlife Coordination Act (FWCA). Responses from the USFWS and the NMFS will be included in the EIS;
- Section 2(b) Report prepared by the U.S. Fish and Wildlife Service. This report will be done in accordance with Section 2(b) of the Fish & Wildlife Coordination Act. The final product will be included with the EIS and excerpts from the report will be included in the body of the EIS;
- Coastal Zone Management Consistency Determination. This project will be coordinated and evaluated with the State of Hawai'i, Coastal Zone Management (CZM) Program for consistency determination. The results of the analysis will be included in the EIS as an appendix;
- Cultural Resources Studies. Historic preservation studies shall be undertaken in compliance with the National Historic Preservation Act of 1966, as amended, pursuant to implementing regulation 36 CFR Part 800. These studies shall include, but are not limited to, cultural resource inventory surveys as well as coordination and consultation with the State Historic Preservation Office, the Office of Hawaiian Affairs, the Department of Hawaiian Home Lands, and other Hawaiian and local community organizations knowledgeable in cultural practices of the area.

Feasibility study efforts consist of archival investigations for the project area. This effort will involve field investigations and an archival search. The archival search will make use of the Great Mahele Land Division records and construction records of structures (including bridges, tunnels, etc.) built prior to and during World War II. During the archival search, the following will be documented: (1) potential localities within the project area where cultural resources (both traditional Hawaiian and “post-contact”) may exist; (2) the type of cultural resource (e.g., traditional Hawaiian house foundation, historic house structure, etc.); (3) the potential significance of the identified cultural resource in terms of the National Register of Historic Places; (4) what further investigations would be required in the event that a particular cultural resource is impacted; and (5) what level of coordination with state and Federal agencies would be required in the event that a particular cultural resource is impacted. Preliminary indications are that a large number of historic-period structures exist in the project area (i.e., Waikīkī, Kapahulu, McCully, Mo‘ili‘ili, and Ka‘imukī). Thus, the effort required to complete archival investigations of potential cultural resources is substantial.

Upon the identification of final feasibility phase alternatives, the results of the previous archival search will be used to conduct significant assessments of the cultural resources that may be impacted. This effort would consist of more detailed archival and background research and is contingent upon (1) the number of target locations identified; (2) accessibility to and expected cultural resources in each target location; and (3) the level of coordination required to ensure state and Federal environmental compliance.

All previously generated information relative to cultural resources investigations in the project area will be utilized to the extent possible.

6.7.1 Hazardous, Toxic, & Radiological Waste Preliminary Assessment. As part of the EIS, the State of Hawai‘i Department of Health and the project sponsor will be contacted for information on hazardous, toxic, & radiological waste (HTRW) in the project area and vicinity. A Site Investigation (SI) will also be conducted. The primary objective of the SI is to evaluate those areas within the project site that may contain HTRW contaminants, estimate the volume and level of contamination and to a limited extent, assess possible remedial action alternatives with respect to the available data. When completed the SI will satisfy HTRW data requirements for the feasibility level planning study as outlined in ER 1165-2-132. Additionally, HTRW investigations will take into consideration anticipated dredging of the Ala Wai Canal that the State of Hawai‘i is proposing. Any information pertinent to HTRW investigations generated as part of the State’s effort will be utilized during this feasibility study.

The SI may include sampling of surface soil, sediment, and water, as well as subsurface drilling and soil/groundwater HTRW sampling operations. Sampling locations and analytical testing requirements will be selected based on the initial assessment conducted during the reconnaissance level site investigation. Sampling and testing procedures will be accomplished in accordance with ER 1110-1-263.

A site investigation report will be prepared and included as part of this feasibility study. The report will summarize the sampling and analytical testing work efforts accomplished; identify the sampling locations; the extent and degree of contamination; and provide recommendations on avoiding, minimizing, or remediating the contamination as appropriate.

6.7.2 State and Local Permit/Certification Acquisition. In addition to the aforementioned environmental tasks, the Government will coordinate with the regulatory agencies with authority and jurisdiction in order to obtain the following State and local permits and certifications.

- Stream Channel Alteration Permit. The Corps of Engineers, Honolulu District (Corps) will coordinate the project for evaluation with the State of Hawai‘i, Department of Land and Natural Resources, Commission on Water Resources Management for permit applicability and project requirements. The results of the evaluation will be included in the EIS.
- Conservation District Use Application. The Corps will coordinate the project for evaluation with the State of Hawai‘i, Department of Land and Natural Resources, Land Division for use of areas within the State’s conservation district. The results of the evaluation will be included in the EIS.
- Shoreline Certification. The Corps will coordinate the project for evaluation with the State of Hawai‘i, Department of Land and Natural Resources for certification of shoreline improvements. The results of the evaluation will be included in the EIS.
- Special Management Area Permit. The Corps will coordinate the project for evaluation with the City and County of Honolulu, Department of Planning and Permitting for improvements within the City’s Special Management Area. The results of the evaluation will be included in the EIS.

6.7.3 Draft and Final EIS Preparation including Appendices. The draft and final EIS will be a compilation of all the products discussed above.

6.8 Cost Engineering Analysis. A cost engineer will conduct site visits, calculate quantity take-offs from design drawings, estimate costs, and determine construction performance periods for each alternative. The cost of each alternative will be estimated using the Corps of Engineer’s MCACES program and meet all applicable regulations and guidelines for a Corps cost estimate.

These cost estimates will be used to determine the National Economic Development alternative in the economic analysis. The project costs obtained for the economic analysis will be based on the price level immediately before or during the period of analysis. The cost estimate for the recommended alternative will serve as a starting point for the development of more detailed project costs in the Plans and Specifications phase.

The results of the cost engineer’s analysis will be included in a Cost Appendix to the main report.

6.9 Economic Studies. The areas affected by floods of various magnitudes will be determined by hydrologic engineers. The economic study will focus on potential inundation damages primarily in Waikikī, Kapahulu, McCully, Mo‘ili‘ili, Ka‘imukī, Makiki, Mānoa, and Pālolo.

Damages to residential, commercial, and other structures and their contents will be investigated. The Corps economists will use computer models that incorporate the values of the structures and their contents, the heights of their first floors, the heights of the flood waters, and the depth-damage relationships associated with each structure to estimate inundation damages. Data from past floods in the study flood plain as well as other parts of O'ahu will be collected and used to estimate damages to automobiles, yards, and other outside property. Expenditures on emergency responses both during and after floods will be included in the analysis. Travel delays caused by flooded streets will be considered. The impact of the proposed alternatives on the Flood Insurance Rate Maps will also be examined. Economic optimization will be determined through the analysis of various flood prevention measures and different levels of protection. The National Economic Development alternative will be the plan with a benefit-cost ratio greater than one and the highest net benefits of all the alternatives considered. A risk and uncertainty analysis will be completed for the economic analysis.

In addition to benefits from reductions in flood damages, the economic analysis will include benefits from ecosystem restoration as well. Working with the study's ecologist, a measure of ecosystem restoration will be determined, data for that measure collected under without-project conditions and estimated for with-project conditions, and benefits computed. The economist will input their findings into the IWR-PLAN program to determine the level of environmental output for each alternative.

Results from the flood damage reduction and ecosystem restoration analyses will be included in an Economic Appendix to the feasibility report. The economic appendix will include detailed explanations on the methodology, assumptions, data sources, and results from both investigations.

6.10 Risk and Uncertainty Analysis for Hydrology, Hydraulics, and Economics. The flood damage reduction investigation will be conducted using a risk-based analysis framework in accordance with current HQUSACE guidelines for feasibility level flood control studies. This analysis will include the estimation of probability distributions of underlying variables, parameters, and components for use in a program called HEC-FDA, which was developed by the Corps. The HEC-FDA program will combine these distributions into higher level measures of overall economic and engineering performance and reliability for the different alternatives. The findings of the risk and uncertainty analysis will be included in the Economic Appendix.

6.11 Real Estate Studies. The Federal government in-house forces will prepare a gross appraisal of the project site with appropriate review and approval. A Real Estate Supplement (RES) will also be prepared by Federal government in-house forces and appended to the feasibility report which will describe the minimum real estate requirements for the proposed project including estates, costs, and schedules. A significant amount of data required for these reports will be provided by the project sponsor. These work tasks include but are not limited to the following items:

- Maps of the project area will be obtained with sufficient detail to identify the types of lands and improvements that will be impacted by the proposed project;

- County tax office ownership and valuation data will be collected on affected properties;
- A detailed inspection of the proposed project area will be performed. The project sponsor's land acquisition experience and ability to acquire the necessary real estate interests in accordance with Title III of Public Law 91-646, including capability to condemn will be assessed;

A real estate map indicating the types of estates and acreage will be prepared. The total number of ownerships and the types of properties within the project area will be identified. Rights-of-entry permits for all activities that require entry through private property will be obtained.

6.11.1 Gross Appraisal Report. A gross appraisal will be prepared which will include the following:

- Maps of the existing Makiki Stream, Mānoa-Pālolo Stream and the Ala Wai Canal vicinity indicating sufficient detail to identify the types of lands and improvements that will be impacted by the proposed project. Local real estate markets will be researched to gather data about recent land sales and offers for sale of improved and unimproved properties comparable to the rights-of-way required for alternative plans. This market information will be the basis for values of the various types of properties within the proposed project area.
- A detailed inspection of the proposed project area will be performed noting the type of improvements (i.e. business related) and the number and value within the project limits. Those improvements lying adjacent to the project limits that may be impacted by the project and the unimproved properties that may be damaged by the project will be determined. Severance damages that may be caused by loss of access, distortion of tracts, or uneconomical remnants will be estimated as a lump sum.
- The total number of ownerships within the project area will be verified by the project sponsor based on detailed project plans used in conjunction with the latest ownership maps available.

Upon completion of all field work, a written report containing a general description of the project area, a summary of the highest and best use of the land involved, a summary of all sales and offer data with a location map, a detailed breakdown of the values for the land and improvements, severance damages, and appropriate contingencies will be prepared for this feasibility report.

6.11.2 Real Estate Supplement. A Real Estate Supplement (RES) will be prepared and will contain the following:

- The project name and location;
- A general description of the area and total acreage to be acquired;
- If any Federally owned land is within the area, the RES will indicate the Federal estate, degree of interest required for project purposes, and views of local representatives of the controlling agency as to use for project purposes;
- If any project sponsor owned land is within the area, the RES will indicate the project sponsor's estate and degree of interest for project purposes;

- An assessment of the project sponsor's land acquisition experience and ability to acquire;
- A baseline cost estimate for real estate;
- A map showing the project area including minimum estates, property lines, utilities and facilities to be relocated, and any known or potential Hazardous and Toxic Waste (HTW) lands;
- A discussion concerning any proposed non-standard estates;
- A detailed schedule of all real estate acquisition activities or milestones for the Sponsor and the Corps of Engineers;
- A discussion of the attitude of the landowners;
- Any other relevant real estate information appropriate for this project.

6.11.3 Rights-of-Entry. The Government in a timely manner shall provide the Non-Federal Sponsor with general written descriptions, including maps as appropriate, of the lands, easements, and rights-of-way that the Government determines the Non-Federal Sponsor must provide. The Non-Federal sponsor shall provide the Government with authorization for entry to all lands, easements, and rights-of-way the Government deems necessary for this project. Prior to the end of project construction the Non-Federal Sponsor shall acquire all lands, easements, and rights-of-way set forth in such descriptions.

6.11.4 Economic Analysis Support. In addition to fulfilling the real estate requirements of this study, a real estate expert will also provide information used in the economic analysis. Structure values will not be readily available for all types of structures. In those cases where structure values are unavailable, they will be estimated by an appraiser. It is anticipated that the appraiser will combine information gathered in the field with information available from the Marshall and Swift Valuation Service to determine replacement cost new values for certain structures. Also, the information gathered in the field can be helpful in determining first floor uses of the various multi-purpose structures in the flood plain. The replacement cost new values estimated by the appraiser will be added directly to the structure inventory for the flood plain.

6.12 Value Engineering. A Value Engineering study is not required for this project feasibility phase.

6.13 Public Involvement. The PM and study team members will meet with the public as required under NEPA. Additionally, the PM and sponsor representatives will conduct meetings and coordinate with community groups, elected officials, agencies, and other stakeholders as necessary.

6.14 Technical Review. A technical review will be conducted as described in Section 19.

6.15 Construction Coordination. Construction coordination will be minimal during this phase.

6.16 Project Management. The Project Manager (PM), with guidance from the Executive Committee, will be responsible for managing project cost, budget, schedules, scope and quality, as well as interfacing with those involved in the study process such as customers, functional elements, government, and non-government entities. The PM also serves as the plan formulation

leader. The PM has the leadership responsibility for the development and management of the PMP with full support of the PDT. The PM will be totally responsible for the delivery of the project on time and within budget. The PM will be the primary writer of the report. The PM will meet with elected officials, community groups and others as necessary and attempt to meet with those opposing the project.

The Sponsor is represented by the DLNR Engineering Division. Coordination with the sponsor's representative is the primary responsibility of the PM.

6.17 Program Management. The Program Analyst is responsible for budget formulation, execution, review and analysis. Maintains and analyzes data in various systems to prepare and update programming documents. Monitors execution of project obligations and expenditures. Prepares final accounting and financial close out upon completion of the project.

6.18 Public Affairs. Due to the sensitive nature and vicinity of this project, the Public Affairs Office (PAO) plays a critical role in controlling information release to the general public and interest groups.

7.0 PROJECT MANAGEMENT

7.1 Overall Project Management. An Executive Committee comprised of the Chief, Programs and Project Management, equivalent Sponsor representative, and key management personnel has been formed to oversee the execution of this project. The members are:

Mr. Jim Bersson, Chief, Programs and Project Management Division;
Mr. Curtis Yokoyama, Acting Chief, Engineering and Construction Division;
Mr. Paul Mizue, Chief, Civil and Public Works Branch;
Mr. Derek Chow, Senior Project Manager, Civil and Public Works Branch;
Mr. Eric Hirano, State of Hawai'i, DLNR, Chief Engineer, Engineering Division;
Mr. Eric Yuasa, State of Hawai'i, DLNR, Chief, Planning Branch.

7.2 Project Delivery Team. See Appendix A for the Project Delivery Team list.

7.3 Project Management Roles and Responsibilities. The Project Manager (PM) will be responsible for managing project cost, budget, schedules, scope and quality, as well as interfacing with those involved in the study process such as customers, functional elements, government, and non-government entities. The PM has the leadership responsibility for the development and management of the PMP with full support of the PDT. The PM will be totally responsible for the delivery of the project on time and within budget. This project has been placed in the new P2 project management system.

8.0 PROJECT SPONSOR

In a civil works project, the terms project sponsor, non-federal sponsor, local interest, customer, and partner are used to identify the people and organizations with which POH has joined in a

shared study. For purposes of this study, these terms will collectively refer to the State of Hawai'i.

As the project sponsor, the State of Hawai'i, as represented by Engineering Division, is expected to actively participate in the continued development of the feasibility study activities, including data collection, plan development, economic analysis, environmental issue resolution, public involvement, public meetings, coordination with agencies, EIS prep, preliminary design, etc. The feasibility phase is funded equally between the Federal government and the Sponsor.

9.0 REPORT PREPARATION

The Federal government and/or consultant will prepare the feasibility study documents. This includes the EIS, preliminary design, engineering appendices, and report.

The feasibility report and EIS will be integrated into a single document. The value of this is the elimination of duplicative descriptions of the alternative analysis making the document more concise and straightforward. All disciplines will be producing a technical appendix that clearly explains the methodologies, data, assumptions, conclusions, and recommendations of each discipline's area.

10.0 PUBLIC INVOLVEMENT

The Federal government and the project sponsor will conduct public involvement as related to submission of the SEIS. The Federal government and the project sponsor will arrange, conduct, monitor, and evaluate each public workshop/public meeting. The "public" will include all affected or interested non-Corps of Engineers entities as well as other Federal, state, and local government entities and officials; public and private organizations; and individuals.

As part of the NEPA process a public meeting will be conducted near the end of the study to inform the public of the proposed plan and to solicit their comments. The project sponsor will be responsible for providing the meeting/workshop facility. The Federal government and the project sponsor will work together to develop the public notice for the meeting, the appropriate mailing list for the public notice, and the content of the meeting including the agenda and any visual aids that are necessary. The Federal government and sponsor will jointly preside over the meeting. The mailing list and agenda from the SEIS II public meeting will be used as a starting point.

11.0 SUPERVISION AND ADMINISTRATION

The work performed during this study phase will be coordinated and accomplished by the Federal government and the project sponsor. The work will include all coordination efforts by the study managers and their supervisors with higher authorities and the usual local and government chains of command.

12.0 COORDINATION WITH AGENCIES

Resource agencies will have an integral role in the development of this project. Advisory groups will be established as necessary.

A Technical Advisory Group (TAG) made up of resource agency representatives and scientists has advised the study team with understanding the desires of the community and agencies in the area of restoration and flood control. An Agency Support Group (ASG) was made up of agency representatives and non-profit community group representatives to advise and review the development of the Ala Wai Watershed Analysis. In 2004, the consultant convened a group of ecologist, biologists, and scientists to explore and advise on the specific problems and possible solutions in the aquatic ecosystem.

Agency involvement in the development of the study is key to addressing the community needs and desires as well as to the success of the study.

13.0 FEASIBILITY PHASE SCHEDULE

See Appendix B for the Feasibility Phase Schedule.

14.0 FEASIBILITY PHASE COST

See Appendix C for the remaining Feasibility Phase Cost.

15.0 SCHEDULE OF FISCAL YEAR FUNDING

See Appendix D for the Schedule of Fiscal Year Funding.

16.0 RESOURCE CONTROL

The PM will manage, analyze and control all project and study costs and budgets in accordance with the approved PMP. However, management of funds to provide the required technical products within the authorized budget of the PMP remains the responsibility of the various functional chiefs. The PM's control and management of the overall project and study funds does not relieve the respective chiefs from this responsibility.

17.0 CHANGE CONTROL PLAN

17.1 Project Schedule and Cost Change Authority. The PM will be authorized within the limits defined herein to modify the project schedule and adjust project costs to accommodate changing conditions in a timely and responsive manner. Responsibility for initiating, evaluating, recommending and approving changes, and accountability for the impacts of each change is established in this section.

17.1.1 Schedule Change Authority. The PM is authorized to revise a study work task completion schedule as long as the total study completion schedule is not extended by more than sixty (60) days and major study milestones are not impacted. The project sponsor shall be notified in writing of the schedule change and the reason for the change. Changes that extend the total study completion schedule by more than sixty (60) days or impact major study milestones require approval by the Executive Committee.

17.1.2 Cost Change Authority. The PM will be authorized to execute modifications that increase or decrease individual items within the overall budget, provided that the total study costs are not affected and incur additional obligations of the signatory parties. Modifications beyond the respective total limits require joint written approval by the Executive Committee, in consultation with their respective staffs. The sponsors shall be notified in writing sixty (60) days prior to the additional funds requirement. Any cost changes shall be incorporated in a revision to this PMP document.

17.1.3 Cost Change Funds Acquisition. The PM, working through Programs Management Branch, will be responsible for obtaining all required Federal funds for cost changes. The Sponsor's share of the additional funds will be obtained during construction. If either party is unable to obtain sufficient funds for a significant cost change, the PM will notify the Executive Committee if the study should be amended, suspended, or terminated.

17.1.4 Change Management Plan. This PMP is subject to revisions due to unforeseen circumstances. All changes will be accomplished through amendment of the PMP and revised study phase schedule with the concurrence of the affected PDT members. Cost and schedule impacts will be fully addressed by the PM to the Executive Committee.

17.1.5 Initiation of Change Request. Each functional Division/Branch and/or PDT member will be responsible for initiating a schedule and cost change request as soon as the need for a change arises and is identified in the established design parameters, scope, cost, schedule or funding.

17.1.6 Evaluation of Change Request. The PM will be responsible for coordinating, reviewing and evaluating the overall impact of a change request on the study progress and completion date. The PM will coordinate with all affected functional elements and the project sponsor to insure concurrence and acceptability of all identified project related impacts (time and cost) resulting from implementation. Impacts resulting from a change request will be carefully evaluated and clearly defined and quantified in scope and cost.

17.1.7 Recommendations. When the requested change exceeds the PM's delegated approval authorities or in the PM's judgment requires resolution at higher levels, the PM will recommend the appropriate action to the Executive Committee. The recommendation will be based on a review and evaluation of the organizational impacts and a determination of the project related impacts resulting from the implementation of the change. The PM's recommendation will provide the justification for this action and identify cost, time and other related impacts.

17.1.8 Approval. Changes within the established authority of the PM will be documented on the Project Schedule and Cost Change Request. The PM will coordinate the change with all affected functional elements and the project sponsor and will monitor the use of project contingencies. The PM will revise the PMP or its components to reflect the changes. Changes beyond the PM's authority will be submitted to the Executive Committee for approval.

18.0 REPORTING REQUIREMENTS - PROJECT MANAGEMENT REPORTS

The project schedule and cost change request (SACCR) is a mandatory internal report used to request, review, evaluate, coordinate, recommend and approve changes to the project costs, schedules and funding. The SACCR will be initiated by the District element that first recognizes the need for the change. The initiating element provides the request to the PM for approval of impact assessment, evaluation of project impacts, and after the PM's approval, coordination with the project sponsor, and action by PM or Executive Committee.

19.0 QUALITY CONTROL PLAN

The quality control plan (QCP) for the Ala Wai Canal Project feasibility phase provides a technical review mechanism insuring that quality products are developed during the course of the study. Technical review will consist of a single level study review and will be performed by appropriate personnel throughout the course of the study. All processes, quality control, quality assurance, and policy review, should complement each other producing a seamless review process, which identifies and resolves technical and policy issues during the course of the study and not during the final study stages.

The QCP has been formulated to provide for a sound technical review process that focuses on several objectives. Primarily, quality technical products will be produced through a comprehensive-single-level-technical-review process throughout product development while verifying that functional, legal, safety, health and environmental requirements are satisfied. This review process will insure that a cost-effective solution, while maintaining product requirements, is developed. Technical review will also act as a mechanism to avoid redesign efforts, and will assure accountability for the technical quality of the product. Each technical review objective in the QCP will be satisfied through a seamless review process performed by appropriate personnel, including POH (technical review), POD (quality assurance of technical products), and Headquarters (HQUSACE) (policy review).

The documentation provided for this project study shall be in compliance with Headquarters, USACE regulation and guidance on quality management objectives. Actions provided by the team shall include Independent Technical Review of engineering, planning, and policy issues, adherence to all customer expectations at each product stage, and where appropriate, Value Engineering and Biddability, Constructability, Operability, and Environmental reviews to assure quality measures are provided in products. In Architecture and Engineering firm and professional service actions, consultants shall provide Quality Control Plans to assure similar levels of quality maintenance. Adherence to quality requirements shall be addressed in product review meetings and After Action Reports.

19.1 Technical Review. Based upon cost, technical expertise, and workload, the technical review for the feasibility study will be conducted by in-house resources, other districts, centers of expertise, and/or consultants. The local sponsor will also be involved in the review process by participating in PDT meetings.

19.2 Technical Review Team. The Technical Review Team (TRT) for will be responsible for performing an independent technical review of the feasibility design, report, and EIS. The TRT will consist of one or more reviewers from each functional area and will consist of existing senior staff that perform other technical work but are not involved in the technical products under review. The TRT will be comprised of the same disciplines on the PDT, and will have experience in the type of analyses in which they are responsible for reviewing. Each TRT member will be senior or equal in experience to the analyst or production team member. The TRT will be responsible for verifying: 1) assumptions; 2) methods, procedures, and material used in analyses based on the level of analyses; 3) alternative evaluated is reasonable; 4) appropriateness of data used, and level of data obtained; 5) reasonableness of results; and 6) products meet customer needs and are consistent with law and existing policy. The makeup of the TRT may be modified as the study progresses to match the review requirements.

19.2.1 Programs & Project Management Division TRT Member. The TRT Member from Programs & Project Management Division, Civil and Public Works Branch, will serve as the overall Technical Review Manager. Thus, a minimum of one member from Programs & Project Management Division will reside on the TRT for the feasibility study.

19.2.2 Engineering and Construction Division TRT Members. The TRT Members will be selected from the various offices, districts, centers of expertise, and/or consultants. The members may change as the project progresses and specific project features are better defined.

19.3 Technical Review Meetings and Critical Checkpoints. The quality control process recognizes that the appropriate place to perform one-on-one verification for products will vary among the functional areas. However, the verifications will occur prior to the release of data and/or final products to another office/division, but may include reviewers and PDT members from other functional areas. The one-on-one verifications for both divisions will occur numerous times throughout the feasibility phase. Each one-on-one verification meeting will be documented and become part of the quality control records used in the quality assurance process.

In addition to the one-on-one verification process, there are also points within the study process where it is appropriate for the TRT and PDT to perform the verification process as a team. This feature of the quality control process allows the flexibility to optimize the one-on-one verification process within the functional area while maintaining the team concept during the Independent Technical Review Process. Meetings conducted during this process will be documented and become part of the quality control records used in the quality assurance process. These points in the study process would typically occur during: scoping and plan formulation, defining of existing conditions, alternative screening, plan selection, report review, and the preparation of the project management plan.

19.4 Quality Control Records. Quality control records will be maintained in a technical review package prepared by the TRT-PM and included in the feasibility report. The package will consist of review comments, and a certification checklist. The review comments will summarize the major issues/comments from the independent technical review along with the response or resolution to each comment.

20.0 ACQUISITION PLAN

The feasibility activities will be performed by sponsor personnel, in-house personnel, and supplemented by outsourcing identified below.

	In-House	Prof Service	Other Corps
Hydrologic Studies	X	X	
Hydraulic Design	X	X	X
Civil/Structural Design	X	X	
Economic Analysis	X	X	X
Ecosystem Restoration Feature Development	X	X	
Environmental Impact Studies	X	X	
EIS Preparation	X	X	
Cost Analysis	X	X	
Technical Review	X	X	X
Real Estate	X		

A-E and professional services work identified above will be accomplished using IDIQ contracts previously cleared/coordinated with the Small Business Office at the time the basic contract was awarded. No further small business coordination is required.

21.0 COMMUNICATION STRATEGY

Interagency and internal communication and execution shall be consistent with the study priority and as described under Public Affairs in paragraph 5 above. The PM will serve as primary point of contact with the customer, however direct contact between PDT members and customer is acceptable as required. Accessibility to PMP's will be provided to the PDT. The customer will be kept apprised of all changes requiring PDT approval. PDT meetings, and other team meetings will be conducted regularly throughout the duration of the study phase as required by study activities and issue resolution. Public meetings will be conducted as shown in the milestone schedule. Less formal public, community, and local agency informational meetings will be conducted as necessary.

22.0 VALUE ENGINEERING PLAN

The PM has determined that a VE study will not be conducted in the feasibility study and more appropriate for the design phase.

23.0 AFTER ACTION REVIEW

The purpose of an after action review (AAR) conference is to learn from, improve upon, and document successes and deficiencies of studies and projects. The goal of an AAR is to improve study processes, products and customer satisfaction. The Project Manager will conduct an AAR upon completion of the study phase. PDT members shall participate in the AAR.

APPENDIX A - PROJECT DELIVERY TEAM

A Project Delivery Team (PDT), led by the Project Manager, is responsible for coordinating and executing all tasks and related matters pertaining to the PMP including cost estimates, schedules, financial transactions, and recommendations to the Executive Committee for termination, suspension, major revisions to the milestone schedule, or amendments to the study. The PDT will also ensure that Corps policy, project sponsor objectives, and the framework provided by the PMP are followed.

The representatives on the PDT are:

Mr. Derek J. Chow, Project Manager, Civil and Public Works Branch;
Mr. Eric Yuasa, State of Hawai'i, DLNR, Engineering Division;
Mr. Michael Wong, Hydrologic Engineer, Civil Works Technical Branch;
Mr. Eric Li, Hydraulic Engineer, Civil Works Technical Branch;
Mr. Douglas Symes, Economist, Civil Works Technical Branch;
Mr. Ron Pang, Cost Engineer, Cost Engineering Branch;
Ms. Cindy Barger, Environmental Coordinator, Environmental Technical Branch;
Mr. Mike Sakai, Realty Specialist, Real Estate Division;
Ms. Jenny Masunaga, Attorney, Office of Counsel;
Ms. Geoff Lee, Program Analyst, Civil Programs;
To be determined, Value Engineer;
Mr. Ray Kong, GT Technical Review;
Mr. Joe Bonfiglio, Public Affairs Officer, Public Affairs Office;
Mr. Dayan Vithanage, Oceanit Laboratories;
Mr. Bruce Tsuchida, Townscape Inc.

APPENDIX B – FEASIBILITY PHASE SCHEDULE

The following is a contemporary schedule of activities reflecting current situations. This schedule takes the project from preparation of the feasibility report and EIS to preparation of the design agreement.

MAJOR PROJECT MILESTONES	ESTIMATED START DATE
Initiate Feasibility Study	April 2001
Public EIS Scoping Workshop	June 2004
Preliminary Draft Feasibility Report/EIS Review in District	September 2008
Preliminary Draft Feasibility Report/EIS Review by Division	November 2008
Submit Alternative Formulation Briefing (AFB) Preconference Documentation	December 2008
Alternative Formulation Briefing	January 2009
Draft Feasibility Report/EIS Review by Division	March 2009
OEQC Notice/Federal Register Notice of Public Review	April 2009
Public Review of Draft Feasibility Report/EIS	April 2009
Public Meeting	May 2009
Final Feasibility Report/EIS Review by District and Division	August 2009
District Engineer Signs/Submits Final Feasibility Report/EIS to Division	September 2009
Division Engineer's Public Notice	October 2009
After Action Review Conference	November 2009
Washington Level Review	November 2009-January 2010
Initiate Preparation of Design Agreement	January 2010

Updated on 30 Sep 04

APPENDIX C - FEASIBILITY PHASE COST

The following is a current resource allocation plan:

<u>TASK</u>	<u>BUDGET</u>
Project Management	\$ 713,000
Watershed Analysis/Plan Formulation	\$ 108,000
Topographic Survey	\$ 375,000
Hydrologic Investigations	\$ 241,000
Stream Gauging	\$ 77,000
Hydraulic Studies/Design	\$ 577,000
Civil/Structural Design	\$ 205,000
Geotechnical Study	\$ 120,000
Environmental Studies/Restoration Design	\$ 328,000
USFWS 2b Analysis	\$ 75,000
Cultural Resource Study	\$ 450,000
EIS Preparation	\$ 282,000
Economic Analysis	\$ 331,000
Cost Engineering	\$ 99,000
Real Estate Assessment	\$ 106,000
Value Engineering Study	\$ 75,000
Task Order Preparation	\$ 48,000
Independent Technical Review	\$ 50,000
Budget/Programming	\$ 200,000
Feasibility Report Preparation (incl. Public Mtgs)	\$ 100,000
Report/EIS Review Management	\$ 60,000
Flushing System and Aeration System Study	\$ 480,000
	\$ 5,100,000

Updated on 14 June 2006

Additionally, due to the location of the project, considerable effort is expected by Public Affairs.

APPENDIX D - SCHEDULE OF FISCAL YEAR FUNDING

(x1000)	FY06	FY07	FY08	FY09
Federal funding	\$500	\$600	\$700	\$200

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
Land Division
Honolulu, Hawaii

0-13

September 8, 2000

Board of Land and Natural Resources
State of Hawaii
Honolulu, Hawaii

RESUBMITTAL
Authorization to Enter Into a Feasibility Cost Sharing Agreement
Between the US Department of Army Regarding
the Ala Wai Watershed Feasibility Study

This item was deferred by the Board at the August 25, 2000 meeting because the submittal did not include the duration of the study and the Project Study Plan (PSP). Also, additional information was requested to clarify the scope and specific purpose of the study.

The Land Division desires to enter into a Feasibility Cost Sharing Agreement (FCSA) with the U.S. Department of Army (DA) for the Ala Wai Watershed Feasibility Study.

The FCSA is an agreement between DA and DLNR (Sponsor). The agreement defines the roles and responsibilities of DA and Sponsor, and financial obligations of the sponsor, for the preparation of the feasibility study. DLNR's share of the study cost is \$830,000, which is 50% of the \$1,659,000 study cost. The Study is anticipated to begin in October 2000, and be completed in August 2003.

The purpose of the feasibility study is to identify and formulate potential alternative plans to improve the water quality within the Ala Wai Canal and its tributary streams; to mitigate flood damages to the surrounding areas; and to obtain DA approval for the implementation (design and construction) of one or more alternative plans. Should one or more of the alternative plans be approved for implementation, DA would be responsible for 65% of the design and construction cost. DLNR and/or other sponsors would be responsible for 35% of the design and construction cost.

The feasibility study will evaluate the alternative plans for engineering adequacy, economic viability, environmental acceptability, and sponsor support. The alternative plans include but are not limited to the following:

- 1) Alternative 1 - No Action
- 2) Alternative 2 - Canal Dredging
- 3) Alternative 3 - Install Flushing System
- 4) Alternative 4 - Provide Sediment Detention Basins and Bank Stabilization
- 5) Alternative 5 - Improvements to Bottom Stream Design
- 6) Alternative 6 - Improvements to the Ala Wai Canal Bridge Crossings, Walls and/or Adjacent Areas for Flood Mitigation

Approved by the Board of
Land & Natural Resources
at the meeting held on

9/7/00

W. L. L. L. L.

ITEM D-13

The feasibility study will also include environmental documentation to satisfy the National Environmental Policy Act (NEPA) and Hawaii Revised Statutes (HRS) Chapter 343 requirements, and information to justify further DA involvement.

Funds for the Ala Wai Watershed Feasibility Study are available from Act 281, SLH 2000, Item A-16C.

For your information, a copy of the Draft FCSA and PSP, which are subject to change and the Ecosystem Restoration Ala Wai Watershed General Investigation Report, dated August 1999, are attached.

RECOMMENDATION:


That the Board of Land and Natural Resources authorize the Chairperson to sign the Feasibility Cost Sharing Agreement for the Ala Wai Watershed Feasibility Study and other necessary documents pertaining to the study, subject to Deputy Attorney General's approval as to form and Governor's release of funds.

Respectfully submitted,


DEAN UCHIDA
Administrator

Attachment

APPROVED FOR SUBMITTAL:


TIMOTHY E. JOHNS, Chairperson

Ala Wai Watershed Feasibility Cost Share Agreement

12. **Approved as Submitted.**
13. **Approved as Amended.**— The Board amended the staff recommendation adding the following condition:
 1. That the Engineering Branch, provide a quarterly report on the status of the project's budget and schedule.
14. **Approved as Submitted.**
15. **Approved as Submitted.**
16. **Approved as Submitted.**
17. **Approved as Submitted.**
18. **Approved as Submitted.**
19. **Approved as Submitted.**
20. **Approved as Submitted.**
21. **Withdrawn.**—The Chairperson had some concern regarding the payment of lease rent to OHA and DHHL. The Chairperson and Board want to discuss this matter with the Attorney General's Office before proceeding further.
22. **Approved as Submitted.**
23. **Approved as Submitted.**—The Board accepted the staff recommendation; however during discussion on the motion, the Board provided several reasons for their denial that were not addressed in the staff recommendation. The Board decision was based on information from the Staff submittal as well as testimony received at the Board meeting, and applicable sections of the Administrative Rules.

Some on the Board expressed it's position that some of the information was technical in nature and could possibly be provided as a part of the normal plan approval process after the CDUA was approved. Nevertheless, the denial was based mainly on their position that reasonable use of the property had been afforded the applicant on the non-conservation zoned portion of their property. The one-house per legal lot in the Conservation district, in their opinion, was based on both limiting development in the Conservation District while allowing owners reasonable use of their property.